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The Priceless Dietetic Value of Florida's Tropical Fruits--the Citrus, the Avocado, the Papaya

BY JOHN HARVEY KELLOGG

Miami Springs (Miami), Florida, at Meeting of Florida State Horticultural Society

Florida's unique climatic and soil conditions adapt it to the cultivation of a very great variety of tropical as well as subtropical fruits. In this respect it is unique. South Florida is even more consistently tropical than Cuba. The temperature is much more equable and extremes of temperature less pronounced than in any other part of the United States. This fact adapts it to the cultivation of exotic fruits which thrive nowhere else in continental America. I am informed by Dr. David Fairchild that at the present time there are growing and fruiting in Florida not less than 150 tropical fruits, less than half of which are grown in any other state. Many of these are choice products which possess qualities which in time may give them commercial value. The limits of this paper permit me to discuss only those few of our choice tropical fruits, the production of which have already become large and growing industries, the citrus, especially the orange, grapefruit and lemon, the avocado and the papaya.

Citrus Fruits

The United States possesses the ad-

vantage over all other countries of comprising within its own continental borders climatic and soil conditions adapted to the production of the finest food products of both temperate and tropical regions. Thanks to its peculiar relation to weather making factors, a considerable part of the Florida peninsula is like what one would expect to find in a bit of the tropics which had been picked up and transported a few hundred miles to the north. In the circumscribed region the avocado, the papaya and the various varieties of citrus fruits grow and flourish as in countries 10 degrees farther south; in fact, under the magic touch and the preserving labors of American horticultural experts, these fruits have been within the short half century during which special attention has been given to their culture here, so greatly developed and improved that they have reached a degree of perfection which they have seldom elsewhere attained.

Through the growing of these

choicest of tropical horticultural products Florida is making and will continue to make for ages to come its greatest contribution to the welfare of our country and the world. The climatic advantages enjoyed by the hundreds of thousands who annually seek protection under these sunny skies from the killing Arctic blasts of the North are priceless, but they are small compared with the benefits conferred by the use of its tropical fruits upon millions who are denied the privilege of basking in Florida sunshine and breathing its balmy air while winter storms are devastating every other portion of the United States.

The citrus has saved more human lives than has any other fruit, perhaps more than all other fruits together. Its life saving value is not a new discovery. More than 200 years ago, when scurvy was a scourge to which thousands of sailors, soldiers and others confined to a monotonous diet, annually fell victims, Kramer wrote, "If you have oranges, lemons, citrons or their pulp and juice preserved in whey in a cask, so

**"The Vitamins" by Sherman and Smith, The Chemical Catalog Company, New York.

that you can make lemonade, or rather give to the quantity of three or four ounces of their juice in whey, you will, without other assistance, cure this dreadful disease."*

In 1804, the British government banished scurvy from its navy by issuing rations of lemon juice, and since 1867, British shipmasters have been required by law in provisioning their ships to include an adequate quantity of lime or lemon juice as a protection against scurvy; but only in recent years has it become known that scurvy is not confined to sailors, soldiers, prisoners and other isolated groups of men, but is a widespread disease, a malady, in fact, which in latent form affects more or less whole nations and especially the more civilized portions of the human race.

The Discovery of Vitamins

One of the most brilliant and life saving discoveries ever made in relation to human nutrition and one in which American investigators have played a very prominent part, is the fact that in addition to the starch, protein, fats and food minerals which by the marvelous alchemy of digestion and the miraculous transfiguration called assimilation are converted into human flesh, all wholesome foods contain certain subtle substances known as vitamins, which serve as catalysts, chemical bodies which by their mere presence, even in exceedingly minute quantities, cause changes so striking as to be quite unbelievable without the most incontrovertible proof. It is the absence of one of these chemical prestidigitators, known as vitamin C, which gives rise to scurvy, a disease in which all the vital functions fail, the gums become sore, the teeth loosen and fall out, dropsy develops and terrible ulcers appear at various parts of the body, and finally death occurs.

When vitamin C is present, but in insufficient amount, nutritive disturbances appear, the nature and intensity of which depend upon the degree of the deficiency.

Twenty years ago, Drs. Hess and Fish made a study of the children of an orphan asylum where a large number of the children were suffering from undoubted scurvy caused by the use of sterilized milk. Vitamin C is easily destroyed by heat. The children quickly recovered when given small amounts of orange juice.

Millions of Americans Suffer from Scurvy

This experience led to extensive and thoroughgoing research which has demonstrated the widespread prevalence of scurvy not only in infants, but in young children and even in

adults, due to the use of foods in which vitamin C is naturally lacking or in which it has been largely or wholly destroyed by cooking or other processes. It has been proven that pasteurizing milk lessens its vitamin C content. Pressure cooking destroys vitamin C. Prolonged fireless cooking greatly lessens the vitamin C content of vegetables. Oatmeal, cornmeal and other cereals contain no vitamin C. The same is true of such dried legumes as peas, beans and lentils. Meats of all sorts, fresh as well as smoked, salted or canned, and also eggs, according to Sherman, contain practically no vitamin C. It is evident, then, that the staple foods in common use in America, bread, meats and breakfast foods, contain practically no vitamin C. It is inevitable that a large part of the population of the United States must be suffering because of this deficiency.

The researches of Hess and many others have shown that a deficiency of vitamin C causes an arrest of growth in infants and young children. An infant that had been fed to the age of 9 months on pasteurized milk and gruels gained only half a pound in weight in 4 months, whereas it should have gained nearly half a pound a week. When given orange juice it began to gain at once and in a month had added two pounds to its weight.

Modern research has thus shown that while the severer forms of scurvy are very rare, this disease in its mild or incipient form is very common. Not only retarded growth, but loss of appetite and other evidences of malnutrition are due to this cause, also anemia and pain or soreness in the joints or muscles, and so-called growing pains.

Vitamin C is a product of plant growth. Its presence in cow's milk is due to the fact that the cow feeds on greenstuffs rich in this vitamin. Dutcher found that in summer the milk of cows fed on grass contained three times as much vitamin C as in winter. Meats of nearly all sorts are almost wholly lacking in vitamin C. In the Arctic regions, the natives instinctively utilize every available source of vitamin C. They regard as a great delicacy the half digested moss which they find in the stomachs of the musk-ox and deer which they kill, but get most of their vitamin supply from the liver of the seal which stores vitamins, and which they eat raw and frozen. Knud Rasmussen wrote in reporting his experience at the end of his trip through the Northwest Passage that when he caught sight of the first ship he was

on board in ten minutes and had his teeth sunk in an orange, for which he had the most intense craving after having eaten raw seal livers for a whole year.

The primitive Eskimos seldom suffer from scurvy because they instinctively take the utmost care to avoid the cause. But through ignorance and lack of instinctive guidance millions of American men and women and especially young children are continually suffering from the dwarfing and weakening influence of vitamin C deficiency and various forms of malnutrition, for which Florida offers in its superior citrus fruits a sure and sovereign remedy.

Florida Citrus Fruits May Save Americans from Becoming a Toothless Race

Forty years ago, I discovered that people who had lost their teeth had lost their gastric juice as well, and I once greatly amused a convention of dentists by reading a paper in which I presented evidence that decay of the teeth was not a purely local disease but was a local symptom associated with other evidences of general physical deterioration, and hence that the tooth brush and dentifrices and even dentists could not be expected to save the race from ultimately becoming toothless. All dental authorities admit this to be true, and Howe and other eminent investigators have shown by experiments upon animals that the teeth are profoundly influenced by the absence or deficiency of vitamin C.

Mrs. Mellanby of London, England, a noted physiologist and for many years widely known as a keen investigator of nutrition problems, has recently published a final report and summary of the results of an intensive study of the causes of decay of teeth extending over more than 16 years, the most exhaustive research of the sort which has ever been undertaken. Examination was made of more than 30,000 teeth in situ and 200 microscopically and dietary studies extending over 2 years were made involving over 400 children. One of the main conclusions reached and supported by convincing evidence is that errors in diet and especially the too free use of cereals is a definite and potent cause of dental decay. Of course the injury is not due to anything which cereals contain, but to the absence of the vitamin C which they all lack. And so while the use of the tooth brush may retain its place as a wholesome sanitary measure, the orange and its citrus cousins offer real salvation from threatened racial toothlessness; and the manu-

facturers of breakfast foods should put upon every package the legend, "An orange a day keeps the dentist away."

The curative value of orange juice was demonstrated by Hanke in a research conducted in connection with the Chicago Dental Research Club. The addition to the diet of a pint of orange juice and the juice of one lemon daily was found to cause prompt arrest of decay and marked improvement in cases of pyorrhea with tightening of the loose teeth.

Citrus Fruits the Most Dependable Source of Vitamin C

Of course vitamin C is found in other foods besides citrus fruits. Nearly all fresh fruits, such as apples, peaches, cherries and berries of any sort contain vitamin C, as do also fresh vegetables and especially such leafy vegetables as cabbage, lettuce and greens; but the amount is variable, changing very materially with the season and degree of maturity, some vegetables containing considerable vitamin C when very young but little when fully mature. The vitamin content in very many instances diminishes notably with prolonged storage. The vitamin content is also influenced by the soil. But careful research has shown that oranges and other citrus fruits are not subject to this variability in vitamin C content so that orange juice and grapefruit juice are stable and thoroughly dependable sources of this precious food factor on which anxious mothers may always depend and certain to afford infants and young children the protection which they require.

Orange and Grapefruit Juice Cure Anemia

Although dental decay is perhaps the most common manifestation of latent scurvy, another almost equally prevalent condition is anemia or impoverished blood. In a health survey which I made at the first Chicago exhibition, in which the blood of more than 6000 persons was tested, the average homoglobin content was found to be only 80 per cent of the normal, 81 for males and 79 for females, indicating an almost universal anemia. Since "the blood is the life," this means that average citizens are only four-fifths alive and a very large minority are less than half alive. These half-alive people are a heavy burden which must be largely carried by the few who are possessed of 100 per cent red blood and are fully alive.

Another study made of 5000 school children reported at the First Race Betterment Conference held at the Battle Creek Sanitarium in January

1914, showed nearly all to be anemic. The diet of the average American is deficient in available iron, but the deficiency is not sufficient to account for the almost universal anemia which exists. It is a valid inference that the ironation is not well utilized. A group of eminent French scientists recently reported the discovery that by the free use of fruit juices, especially orange, lemon or grapefruit juice, the number of red blood cells and the amount of homoglobin may be rapidly increased. They very justly attributed the good results observed to the richness of citrus fruits in vitamin C, which, although it contains no iron itself, by the magic of its presence enables the blood making organs to make use of the iron and copper which are needed in the making of blood cells by the bone marrow and other blood making structures. If every anemic person in the United States could be induced to drink daily three glasses of orange juice or an equivalent amount of grapefruit juice or lemonade, the demand for calves' livers would soon fall off and the number of deaths from nephritis due to poisonous liver protein would likewise diminish.

Citrus Fruits an Efficient Remedy for Acidosis

Another and most important nutritional value of citrus fruits is due to the large percentage of alkaline salts, chiefly potash, which they contain. The body is constantly making acids, the production of which is enormously increased during work, especially during muscular activity. For example, a sprinter produces when running, a dram of lactic acid per second, or nearly half a pint of this strong acid per minute, in addition to the great volume of carbonic acid gas which is eliminated through the lungs.

To neutralize and carry to the lungs this great amount of acid, it is necessary that the blood should be alkaline and that its alkalinity should be constantly maintained. The necessary alkaline or basic elements must be obtained from our foods. Unfortunately, many of our common foods contain an excess of acids and so, when eaten lessen instead of increasing the alkalinity of the blood. This is true of all foods which leave an acid ash when burned. In the list of acid-ash foods are found all the meats, eggs, the cereals, and two or three vegetables. Two or three fruits also must be put in this class because of unoxidizable acids which they contain; but with these few exceptions all fruits and vegetables are

alkaline or basic-ash and when eaten increase the blood alkalinity. Near the head of the list of alkalinizing foods are found citrus fruits and fruit juices, the most convenient and agreeable means of alkalinizing the blood. Each pint of orange juice contains 13 grains of potassium, one of the most powerful and readily soluble alkalies. Lemon juice contains 9 grains of the alkali to the pint and grapefruit juice 7 grains. Some varieties of citrus are much richer in alkali, the lime containing 24 grains and the sweet lemon 31 grains to the pound.

The potassium of orange juice is combined with citric acid and so does not act as an alkali in the stomach, neutralizing the gastric juice and arresting digestion as do soda and other alkalies. After the orange juice is absorbed in the blood, the acid is oxidized and used as food the same as starch or sugar, thus setting the alkali free to help alkalinize the blood and tissue fluids. In this way orange juice combats acidosis, one of the most common predisposing causes of both acute and chronic disease. An excess of acids in the blood and tissue fluids lowers resistance to disease and predisposes to colds, which cost the people of the United States many millions of dollars annually. The common practice of dosing with soda to combat acidosis is objectionable. Soda upsets gastric digestion and imposes an unnecessary burden upon the kidneys.

Acidosis leads to rheumatism, Bright's disease, premature old age, arteriosclerosis, high blood pressure, skin maladies, and various degenerative disorders. Its presence is shown by excessive acidity of the urine, which is an extract of the tissues. Not infrequently the urine is found to be 50 or even 100 times as acid as it should be. A pint or two of orange juice daily will often cause complete disappearance of the excess acidity in four or five days and with the acidity will also disappear a host of disagreeable symptoms, such as headache, loss of appetite, soreness of the muscles, neuralgic pains, nervousness, depression and a host of other miseries.

Every year not less than 500,000 persons in this country die of chronic disorders in which chronic acidosis may be an active or predisposing factor. No doubt the daily use of orange juice might prove the means of saving many thousands of those lives.

Besides a full assortment of vitamins, A, B, C, D, and E, which are powerful nerve tonics, real vital stim-

ulants, which actually energize the nerves, orange juice contains a notable amount of actual tissue building nourishment, nearly one per cent of protein of the choicest sort (.8%) and 11.6% of invert sugar, similar in composition to honey, but absolutely free from contamination of any sort and predigested and so ready for immediate absorption and utilization.

Orange and Grapefruit Juice are Liquid Foods

A glassful (8 oz.) of orange juice contains 120 food units. A few comparisons will give a clearer idea of its food value.

Four glassfuls of orange juice equal in food units 3 glassfuls of milk.

Two glassfuls of orange juice equal three of skimmed milk in food units.

One pint of orange juice more than equals in food units

1 pint of oysters or clams

1 pint of beef tea, chicken broth, or mock turtle soup

1 pound of egg white

1 pint of red raspberries

1 1/4 pints of strawberries

1/4 pint of oatmeal gruel

1 lb. of carrots

1 1/4 lbs. of cabbage

1 1/2 lbs. of turnips

1/2 lb. green peas

1 1/4 lbs. fresh peaches

The delicious predigested nourishment afforded by orange juice together with its rich store of vitamins explain the remarkable refreshing qualities which make it a favorite beverage the world over. Its remarkable properties entitle it to a higher position than that of a mere palate tickler. It is a life-saver and should replace a long list of harmful beverages which are dispensed at soft drink counters under various alluring titles, some of which promise falsely, "Rest you in 5 minutes," and only produce a drug euphoria through the poisonous effects of caffeine while destroying the power to rest normally by natural sleep and causing chronic "nerve tire" and insomnia.

Orange Juice Should Replace Tea and Coffee

Orange juice or lemonade, hot or cold, may well replace those harmful poison-containing table beverages, tea, coffee, cocoa and mate, all of which contain blood-pressure raising caffeine or its cousin theobromine. A government bulletin warns the farmers against the use of cocoa residues as a food for cows because it lessened the flow of milk; as food for fowls because it diminished egg production; as fertilizer because it lessened soil fertility. Cocoa is just as bad for children and nursing mothers as for chickens and cows. Caffeine is used

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medicinally to raise blood pressure. One grain is a dose. A cup of tea of coffee contains 4 to 6 grains of this poisonous drug. Orange juice is not only delectable and harmless, but a powerful nerve stimulant. Its predigested food is ready for absorption and assimilation and its vitamins feed the nerves and aid the digestion of other foods.

Common Errors About Citrus Fruits

There are several popular errors which undoubtedly to some degree detract from the universal popularity which citrus fruits deserve, to correct which a definite effort should be made. One of the most harmful of these is that fruit acids tend to cause acidosis and rheumatism. This is not only untrue, but the fact is the very opposite. This has long been known to science, but the prejudice against the use of acid fruits in rheumatism is so deeply seated little progress has been made toward its removal. There are still many physicians who advise against the use of lemons, grapefruit and even oranges in rheumatic affections and in all conditions in which acids are known to be present in excess. The use of orange juice to the extent of one or two pints a day is one of the best known means of combating acidosis.

Because milk curdles on the addition of lemon or orange juice, many persons avoid the use of milk and citrus fruit juices at the same meal. This is quite unnecessary since the curdling of milk by an acid does not in the slightest degree impair its quality or digestibility. The gastric juice itself is highly acid and coagulation of the milk is the first step in its digestion. I learned many years ago that the digestibility of milk is, in fact, increased by the addition of lemon juice, as by this means fine curds are formed which are readily dissolved by the gastric juice, whereas the stronger gastric acid, especially in cases of hyperacidity, is likely to produce large tough curds which are long retained in the stomach. The addition of lemon and orange juice to the milk is an excellent remedy in cases in which undigested curds are found in the stools.

Mixture of Citrus Fruits with Starchy Foods Not Unwholesome

An error which in recent years has become quite prevalent is the idea that oranges and grapefruit should not be eaten at the same meal with starchy foods, such as bread, breakfast foods or potatoes. This error, I think, grew out of an observation made many years ago by Sir William Roberts, an English physiologist, who

discovered that certain acids hinder the digestion of starch. He found that one part in 10,000 of oxalic acid, acid of pieplant, and one part in 2,000 of acetic acid, the acid of vinegar, would completely arrest the salivary digestion of starch. From this the erroneous conclusion was drawn that all food acids hinder starch digestion. Careful laboratory researches have demonstrated that this is not true of the mild normal food acids, such as the citric acid of the lemon and the orange and the malic acid of apples, but only applies to the strong unwholesome non-food acids, oxalic and acetic. Even lactic acid is free from objection on this ground.

Another erroneous idea is that fruit acids must be avoided in cases of hyperacidity or so-called sour stomach, the supposition being that fruit acids tend to cause fermentation or to excite the excessive secretion of acid by the stomach. The acidity of so-called sour stomach is not due to fermentation. Fruit acids never cause gastric irritation, but when the stomach and duodenum are hypersensitive as the result of irritation from the use of mustard, pepper, pepper sauce, the excessive use of salt, hot sauces and vinegar, the free use of cane sugar, confectionery and other gastric irritants, concentrated acid fruit juices may give rise to temporary discomfort, but they neither cause nor aggravate the diseased condition. In such cases the use of acid fruit juices may be restricted temporarily till the existing irritation is relieved by removal of the cause. Fluid of any sort, either with or without acids, taken freely at meals, is said by Pavlov, may cause hyperacidity by overstimulating the gastric juices.

Orange Juice Excellent for Young Infants

Still another popular error is the idea that orange juice should not be given to young infants. Hess has shown that orange juice may be given in teaspoonful doses to infants a month old or even younger not only without injury but with great benefit. An infant three months old should take regularly at least two tablespoonsfuls of orange juice daily.

The Grapefruit

Practically all that has been said in the foregoing pages about the orange, applies equally to the grapefruit. The latter contains less acid than the lemon, less sugar than the orange, and a smaller amount of solids. The grapefruit also contains a little less of the vitamins A and C, but fifty per cent more of precious

blood-building iron.

The nutritional and refreshing qualities of this excellent fruit entitle it to a place on every breakfast table in America. Its free use would constitute an insurance against rheumatism and other chronic disorders to which acidosis is a predisposing cause.

Many persons prefer the grapefruit to the orange because of its pleasant acid flavor and its appetizing qualities.

The Lemon

This fruit leads all the members of the citrus family in its richness in iron, of which it contains three times as much as does the grapefruit.

The composition of lemon juice varies considerably, according to the time of picking and the length of time the fruit has been kept, together with the manner of keeping. The chief constituent of lemon juice is citric acid, of which the average lemon contains about 7.5 per cent. A lemon picked in April contains only about two-thirds as much acid as one picked in November. From April on, the percentage of acid steadily diminishes until by July there is little left, the citric acid being converted into sugar (dextrose) and carbon dioxide. This is due to the vital activities of the living cells of the fruit. If oxygen is excluded, by varnishing the fruit, the change may be prevented, as also to a large extent by cold storage.

Lemon juice also contains a notable amount of salts (2 to 3 per cent.) chiefly potash and phosphorous.

The percentage of potassium in lemon juice is greater than in either apple juice or grape juice. This abundant and unusual supply of food minerals makes the lemon an important source of this highly essential food principle, and brings clearly to view the fact that the nutritive effect of lemon juice is that of an alkali instead of an acid, as superficial knowledge would suggest.

It thus appears that the lesson is worthy of a much larger place in our national dietary than it has heretofore enjoyed.

The lime, the Persian lime, the kumquat, and the various other varieties of the citrus family all share the extraordinary virtues of the orange and the lemon and will increase in usefulness as they become known.

The Papaya

Its delicious, spicy flavor and its wholesomeness entitle the papaya to a prominent place among our breakfast and dessert fruits, but it is hardly to be expected that it will fully meet the expectations of those who

have read the enthusiastic accounts of the fruit by some of the earlier writers. Sturtevant's "Notes on Edible Plants" tell us that, according to U. S. Allen, "The fruit is used extensively in south Florida and Cuba for making tough meat tender. The toughest meat is made tender by putting a few leaves or green fruit of the pawpaw tree into the pot with the meat and boiling. In a few minutes the meat will cleave from the bones and be as tender as one could wish." A Mr. Luger stated that "the leaves have the property of making meat wrapped up in them tender" and, according to Brandis, "Meat becomes tender by washing it with water impregnated with the milky juice or by suspending the joint under the tree." According to Williams, the Chinese make use of the fruit "to soften the flesh of ancient hens and cocks by hanging the newly killed birds in the tree or by feeding them upon the fruit beforehand."

It is true that the milky juice of the green fruit or stems of the papaya plant contain a digestive principle, papotia, which acts upon protein in a manner similar to pancreatin or pepsin; but this digestive action is not displayed under any of the conditions named in the above fantastic descriptions, and no just claim can be made for either the ripe fruit or its seeds as a digestant. This property is possessed only by the milky juice of the green fruit. When the rind of the green fruit is incised, a milk-like juice exudes which resembles in appearance the juice of milkweed, which contains a protein digesting ferment; but in the process of ripening, this ferment disappears.

The extravagant claims made by many of those who have undertaken the exploitation of the fruit have no doubt to some degree stood in the way of the progress of this excellent fruit in winning public favor.

Another serious obstacle which remains to be overcome is the lack of standardization of the fruit as regards quality. As is the case with the apple and many other fruits, the papaya is not true to seed. One authority states that from a hundred seeds one may hardly expect to get more than a single plant producing really good fruit. Within recent years considerable advance has been made toward standardization by a few careful growers, some of whom are producing fruit of uniformly excellent quality, and within a few years this obstacle will be overcome. When this is accomplished, the next step will be to educate the fruit consuming public concerning the special food

values of this excellent tropical fruit which presents in solid but readily liquefiable form much the same kind of nutrient found in the orange, although its vitamin C content is very considerable less. However, this deficiency is compensated for by the fact that it contains other vitamins lacking in the orange.

Some years ago at the suggestion of Prof. Mendel of Yale University, I sponsored a research by Blatherwick for the purpose of determining the alkalinizing effects of various fruits by noting their influence upon urinary acidity. It was soon discovered that while nearly all fruits lessen urinary acidity, the cantaloup was far more active than many other.

(Concluded Next Issue)

Country Club Salad

1 cup cold cooked veal
1 cup cold cooked ham
2 cups diced celery

Stuffed olives

Dice ham and veal and add celery. Moisten with chutney dressing one half hour before serving, or any spicy salad dressing may be used. Serve chilled on beds of lettuce, garnished with slices of stuffed olives.

Frank Kay Anderson

Agricultural Advertising

Altamonte Springs, Florida

The Fiftieth
Anniversary
advertisement
of Chase & Co.
on another
page is a
production
of this
service.



The Citrus Industry

with which is merged The Citrus Leaf
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ADVERTISING CITRUS

California has long recognized the importance of advertising its citrus fruits, and has gone about the matter in a business like manner on an extensive scale. Texas, newest member of the citrus producing states, recognizes the importance of this matter, and has taken steps for an extensive campaign next season. Florida has long recognized the importance of citrus advertising, but up to the present time has done very little about it in a really adequate way.

But the American citrus producing states are not alone in recognizing the importance of advertising as a necessary adjunct of citrus marketing. Palestine, home of the Jaffa orange, is the latest to enter the advertising field on an extensive scale in an effort to still further develop the European markets. England and some of the countries of Continental Europe have been invaded by the advertising representatives of the Jaffa growers, and the initial reaction is said to have been most favorable.

With our American competitors carrying on, or preparing to carry on extensive campaigns, it behoves the growers and shippers of Florida to go ahead with definite and elaborate plans for holding their present markets and getting their share of new markets through an aggressive and extensive campaign of advertising. If they are to retain their present European markets, they must meet the more active competition of Palestine growers indicated by the elaborate campaign inaugurated on behalf of the Jaffa orange. If they hope to enlarge their European markets, Florida growers must meet the Palestine growers on their own ground and with their own weapons.

Florida citrus growers have everything possessed by the growers of other states and

other nations, save only a well defined and carefully planned advertising campaign. It is within our power to have such a campaign next season and each succeeding season—but we must begin to plan now, and we must go ahead with a united front, forget minor differences of opinion and work as a single unit for the welfare of the entire industry of the state. Leaders in the industry recognize the necessity for such a campaign, they have been working toward that end diligently and conscientiously. They should have the support of every citrus grower and shipper and of every well-wisher of the state's leading industry.

AN ANNOUNCEMENT

Anderson, Joe in Bay

Disappearance recently of the name of Frank Kay Anderson from the masthead of this publication, and the appearance in its pages of an advertisement of his agricultural advertising service have been remarked by readers.

His decision some time ago to reenter the national advertising field, in which he spent many years in Chicago prior to returning to Florida in 1916, necessitated withdrawal from the publishing business in conformity with advertising ethics. That is why his name is missing from the masthead.

However, the publishers were able to arrange for the continued publication of Impressions each month; and that department so interesting to the growers remains an exclusive feature of THE CITRUS INDUSTRY.

It is needless to say that Mr. Anderson has our sincerest good wishes in his new, or shall we say old, field of endeavor; and we, in turn, are confident of our place in his regard and good will.

CHANGES IN CONTROL COMMITTEE

Recent changes in the representation of certain groups on the Florida Citrus Control Committee have taken from that body several of its most active members and most aggressive workers whose absence from the future activities of the committee will be regretted in many citrus circles.

The industry is fortunate in that the men chosen to succeed the retiring members are men of high calibre, well known in the industry and vitally interested in the success of the growers and shippers of the state.

It is fortunate that any changes made in the membership of the Control Committee come at the close of the shipping season, rather than at the beginning, as the full committee may now go ahead with plans for next season with the assurance that no further changes will be made until next year's crop has been marketed under the plans developed.

It is cheaper to feed the bugs on sprays and dusts than to let them feed upon your trees and fruit.

No grower ever made money on a half-starved or disease infested citrus tree.

FLORIDA VOLCK

the Safe, Efficient and Economical
SUMMER SPRAY

for control of
CITRUS PESTS

•
Spray With
FLORIDA VOLCK
because:

1. It is a *proved* Oil Spray for citrus insect pest control.
2. It has a wide margin of safety for fruit and foliage.
3. It is an *all-season all-year* spray.
4. It gives *real* protection for a whole year.
5. It produces results equalled by no other citrus spray.
6. It is both effective and economical.

•

FLORIDA VOLCK is a safe summer spray. Experience in Florida has shown that in effective dilutions FLORIDA VOLCK has a wide margin of safety for citrus fruit and foliage and may safely be used at high summer temperatures.

Summer spraying with a safe oil emulsion has numerous benefits that will appear in the profits when your crop goes to market.

For Pest Control

Volck enables you to attack scab and melanose before the insects have spread to fruit, young growth and sheltered places such as aphis-curled leaves.

You can get at all insect pests at a time when they are most active, yet most easily killed. You can save fruit that has already become infested.

Volck is especially effective in the control of scale insects and the summer brood of White-flies. It reduces and often controls Mealybugs and Rust Mites. It removes Sooty-mold Fungus.

Nothing to Interfere

Volck enables you to spray at a time when you can devote your attention to the work; when you have your equipment and crew available, and when no harvesting or marketing duties interfere.

It enables you to avoid spraying fruit just before or during cold weather, or early fruit that is in the process of coloring or maturing, or is about to be picked.

It makes spraying possible at a time when climatic conditions are most favorable for rapid volatility of the oil and when there is an abundance of soil moisture and trees are vigorous.

Spray with Volck this summer and reap the benefits that are to be gained from the use of a safe oil emulsion with a proved record of results.

NITRATE AGENCIES COMPANY

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JACKSONVILLE - - FLORIDA



IMPRESSIONS

By Frank Kay Anderson

Recent decision of the Interstate Commerce Commission in the Florida vegetable case, prosecuted by the Growers and Shippers League of Florida aided by the State Railroad Commission, will result in very substantial savings to Florida truck growers, estimated in excess of \$800,000 per season . . . at that the decision is somewhat mixed pickles . . . reductions on some commodities are very considerable, the reductions on celery not so great . . . but reductions in the various minimum carload weights in the long run will permit of better distribution by allowing carload shipments into smaller centers . . . Best news of all, to both truck and citrus growers, and maybe to the railroads too, is the intimidation of the Commission that the Pittsburgh-Buffalo Line soon may be a thing of the past . . . that's an imaginary line running between those two cities which has caused trouble for Florida shippers for a couple of generations . . . Once it had a reason for existence, though few recall it now, but it has remained to plague Florida and to hamper systematic distribution . . . If a carload of freight moves northward from Florida via Potomac yards or other eastern gateway it cannot be moved westward across that Pittsburgh-Buffalo Line . . . Vice versa a car moving through Cincinnati or other western gateway cannot move east of that imaginary line . . . Wipe out the Pittsburgh-Buffalo Line and Florida's freedom of action will be increased greatly . . . Likely the Florida railroads will profit through it, too . . . The foregoing reminds us of a stem-winding speech that Merton L. Corey made in Orlando, at the time of the organization of the Clearing House, which gave us what Elbert Hubbard used to call, "a distinct and localized pain." . . . the said orator got going strong, and then proceeded to tell how the growers suffered by dumb distribution, illustrating his case by the story of a certain specific car of oranges which went first to Nashville, then to Cincinnati, thence to Indianapolis, then to Cleveland, to Albany, then to Boston and finally sold (for a deficit) in New Haven . . . it

was a stirring yarn . . . brought tears to the eyes of many sympathetic growers in the audience . . . but caused us great unrest . . . we sat still, but we wanted to jump up and holler, "What about the Pittsburgh-Buffalo Line?" . . . Meaning, of course, that no carload of Florida oranges could travel the route that Corey's car traveled; and that therefore he was just a romancer and wasn't fooling us a bit . . . Maybe some have detected a shortness of patience we have since exhibited toward the Corey person . . . if so, now the reason is out . . . Up at Jacksonville Colonel John C. Sellers is dead, at the age of 73, and the Florida citrus deal has lost a good, and very intelligent, friend . . . For a number of years the editor of the Farm & Livestock Record of Jacksonville, Colonel

Sellers took keen interest in things citrus . . . His greatest contributions to citrus good, however, came in the form of the editorials he contributed from time to time to the Times-Union, he having served as an editorial writer upon that paper for the past fifteen years . . . In addition to exceptional ability as a writer, Colonel Sellers was a most pleasing speaker and carried Florida's message to many places outside the state . . . Queer that the press of Florida should provide the two greatest speakers of the state during the last two decades, but it has, in the persons of Frank B. Stoneman of the Miami Herald and John C. Sellers of the Times-Union . . . and we haven't forgotten the late William Jennings Bryan when we make that statement . . . Who are these in close confab under



CHASE & COMPANY
SANFORD, FLA.

a Jacksonville entrance archway but George M. Barley of Atlantic & Gulf Fertilizer Co. and R. W. (Bob) Sims of Nitrate Agencies Co. . . . here are two of the liveliest among the younger set in the fertilizer game in the state . . . we pause to see if maybe they won't sell each other, but they are talking of other things . . . A meeting, also upon the street in Jax, with Will Howze, now in the insurance business but in the long ago prominent with Wilson & Toomer, later serving the American Fruit Growers Inc., and one of our favorite people . . . and in the next block we run into Fred Andress long of Orlando, but belonging in Jax the past five years, and also insurancing now . . . And Walter P. Grogan of Paola has passed from among us, dying of pneumonia at a Sanford hospital . . . as manager of the Umatilla Fruit Co.'s Seminole County operations, he was one of the best known and best liked packing house men in that section of the state . . . pneumonia goes hard with big men when it hits them . . . Walter Grogan was only 37 at the time of his passing . . . And Don Gleason well known farm machinery and citrus man of Orlando also has passed . . . a well known and much liked figure, long prominent in Spanish War veteran circles . . . Sorry too to record here the passing of Fred Rundle of Lockhart at 68 . . . long an outstanding figure in Orange county citrus affairs, and active in Florida Citrus Exchange circles . . . Aside from a most excellent grove property which was his pride, Fred Rundle, born in England, in recent years had given large attention to flowers; and his gardens are an important contribution to Florida floriculture . . . Many in Orange county will miss Fred Rundle seriously . . . One of the happiest occasions of recent years for us was the luncheon given in May by the Sanford Rotary Club to celebrate the fiftieth anniversary of the founding of Chase & Co. there, and more particularly to honor Joshua C. Chase and Sidney O. Chase the founders, and still the active heads, of the business . . . Many foremost Florida contemporaries of the Chases invited by the Sanfordians to be present and participate . . . most interesting and likewise educational . . . a lot of ancient history in Florida citrus affairs cleared up for us while we listened . . . made us feel something like a very young and rather fresh small child as we listened to Capt. B. M. Robinson and Chester W. Goodrich of Orlando and some of the other real old-timers tell of far gone incidents

out of the background of the years . . . and the talks by S. O. Chase and J. C. Chase which wound up the affair were full of meat and interest . . . Everyone seemed to catch the spirit of the occasion . . . and unbent accordingly . . . Some one said that S. O. Chase's talk was the longest ever he had made in public, though in reality brief, and far too short to suit many of the interested listeners . . . In Florida few businesses have passed their fiftieth birthday; and none with the success which has crowned the career of Chase & Co. . . . All this plus the presence of the founders, and still the active heads, made the affair one of extreme interest; and a most enjoyable occasion . . . Sitting in at the meeting of the Florida Citrus Control Committee on May 23 . . . and getting an earful . . . Only a brief session of the committee as a whole, this being mostly given over to meet-

ing of the sub-committee having charge of presenting suggested changes in the Agreement and the Licenses to provide for a better and more effective operation for next season . . . Senator A. W. (Tony) Young of Vero presiding as chairman of the sub-committee . . . and how . . . Practically all the members of the Control Committee, their alternates and some other interested growers and shippers present . . . and how the honorable Tony Young kept them working with their noses to the grindstone . . . hot in the room at the afternoon session, almost too hot for real brain-work, and yet plenty of that called for in the proceedings . . . No chance to drowse or wool-gather though with Chairman Young continually prodding things forward . . . "Next item" . . . As it grew late, and still hotter, a tendency for motion makers and seconders to be a little slow in forwarding petty

Without Impurities . . . DEATH!

"A Pure Food and Drug Act for plants would be a death warrant to all living creatures."

—SCIENTIFIC AMERICAN

READ the above statement again. It seems strange. Yet no truer words have ever been written. If all impurities were eliminated from the soil, no man, no beast, no living thing, could stay alive.

Chilean Natural Nitrate, for many years, has stressed the importance of its Nature-given impurities. This magic plant food is the only nitrogen that comes from the ground. It is the only nitrate that contains Nature's blend of rare elements . . . Nature's own balance of vital impurities.

So you see the importance of protecting yourself by specifying Chilean when you buy nitrate. There are two kinds, Champion Brand (granulated) and Old Style. Both are genuine Chilean. Both are natural. Both have the vital impurities. You are safe with either one.

Chilean NATURAL NITRATE

THE OLD ORIGINAL SODA, THE IDEAL  SIDE-DRESSER FOR YOUR CROPS

items concerning which there was unanimous opinion . . . then the chairman snappily adopted an ancient legislative device . . . "It is moved by Mr. Aycrigg, seconded by Mr. Mouser that the item be adopted," he would firmly intone . . . Maybe they had intended to do that, but they hadn't said so . . . or, "On motion of Mr. Stewart, seconded by Mr. Keene, it is moved that the item be approved." . . . and neither of these had even mumbled . . . but on putting of the motion the alleged makers and seconders would come to life, grin and nod approval; and thus many small items, involving the change of a word or two here and there for technical reasons, were gotten out of the way with despatch instead of dangling indefinitely . . . Because of the time consumed and the heat it was a gruelling session . . . even Francis Whitehair, who possesses one of the most alert mentalities we have encountered, slowed up very considerably . . . but the chairman was untiring, inexorable . . . a splendid exhibition of forwarding business in a large committee . . . but not a semblance of what might be called gag rule, and everyone satisfied and pleased . . . By the way, the most interesting development to us in connection with the Control Committee has been the gradual disappearance of the mutual distrust which featured its earlier gatherings . . . as time has passed the individual members have come to have a better mutual understanding and a larger tolerance . . . not only does this result in visibly better feeling, but business is being considerably expedited . . . and the industry as an industry comes in for greater and more intensive consideration . . . It was only toward the close of the shipping season that the Committee began to strike its real stride . . . but the indications are that with the experience of the past to profit by the Committee ought to function ably and well right from the start when next season opens . . . The outlook in that direction is very encouraging . . . Pulling into Haines City early in the morning and parking our car by that beautiful little park near the railroad station . . . we sat and admired the scene . . . and in our mind went back to the earlier days of Haines City when as a settlement it sat astride those anything but beautiful sand hills . . . that park was the dream of Miss Vesta Ohlinger, who ran the Haines City Herald for us when that publication was one of our tenuous string of South Florida papers . . . Getting something to grow on that

sand was a real job . . . funds were mighty scarce too . . . most everything, including the labor, was donated . . . but the persistence of those earlier folk was no less great than was their optimism . . . Miss Vesta Ohlinger is long gone to her reward; but today that park, a finished undertaking, remains a living monument to her, and to the Samplines, the Angles, the Randalls, the Philpotts, the Yales, the Mores and those other optimists of that earlier day . . . So when in Orlando another group of incurable optimists now want to stage a great national fair, naming it Florida On Parade, we are not inclined to deride the undertaking . . . our reaction is one of, Why not? . . . Given the courage and persistence it should be no more impossible for Orlando than was that central park for Haines City when Miss Vesta Ohlinger first visioned it and sold the idea to her fellow townsmen . . . Harold Mowry of Gainesville walked into a drugstore and ordered a can of Pulvex and a box of aspirin tablets . . . A. C. (Buck) Brown thought it a queer order and said so . . . "Nothing odd about it," said Harold Mowry, "I've got a lousy headache." . . . Somebody hollering because the citrus growers of the nation season before last received only twenty-six cents of the ultimate consumer's dollar . . . that's zero in things to holler about . . . it is a higher percentage than the producers of some manufactured products received . . . and, again, we find ourself all bewildered by the figures of the Farm Credit Administration's loans to farmers . . . so colossal that wartime big figures shrink by comparison . . . afraid to trust all those ciphers to the linotyper and proof reader . . . but somehow during the first twelve months of its existence such loans ran to well over three million dollars a day . . . A meeting in Orlando with Paul Stanton of Florida Fruit Canners Inc. of Frostproof, and gracious Mrs. Stanton . . . Paul tells us this season's pack of canned grapefruit amounted to approximately three million cases; and that the canners are looking forward to a continuing expansion as markets are developed further . . . Many in the trade believe the canning of grapefruit will continue to grow until ultimately it reaches the approximate figures of the pineapple pack . . . C. E. Street of Bradenton, as president, and Paul Stanton, as secretary, seem to hold perennial jobs in the Florida Grapefruit Canning Association, which comprises all the larger factors in grapefruit canning . . . And we

can remember when C. E. Street started all this by first bottling grapefruit juice successfully at Haines City . . . Earl Haskins of Winter Haven has been promoted to membership on the executive committee of the Orange Festival . . . Shucks, he was wearing a walking stick and functioning otherwise as one all this last session . . . In Senator Harry Byrd of Virginia the fruit growers of the country have one of their most intelligent friends in Congress . . . the former governor of Virginia, and the brother of the ice-haunting admiral, is one of the largest apple growers in the U. S. A. . . A note from Julian Langner to the effect that his office now is at 221 Investment Bldg., Washington, D. C. . . and he'd like to have any of us Florida guys come up and see him sometime . . . Shortly following Sanford's honoring of the fiftieth anniversary of Chase & Co., the same town turned out to celebrate the fiftieth anniversary of the arrival in Florida of Harry M. Papworth, president now of the Seminole County Chamber of Commerce . . . the said, and same, Harry Papworth came over from England for the avowed purpose of raising oranges, the which he is now doing upon a considerable scale . . . fifty years of constant worry over the overproduction of citrus fruits haven't even put a dent in Harry Papworth to the date of this writing . . . Patent recently issued covers cleaning citrus fruit while traveling in cedar saw-dust . . . probably some new wrinkle in it, as indicated by mixing benzoate of soda with the saw-dust . . . but the first machine-cleaning of citrus fruits was done in saw-dust, as many growers today can recall . . . Let a thing get old enough and it is brand new to a lot of folks . . . And fame is short-lived . . . it was interesting, and a little painful, to find growers attending the Horticultural Society meeting recently inquiring the why of the Krome Memorial Institute . . .

(Continued on page 16)

PATENTS

Send me sketch, picture, or model of your new invention. I will give you prompt report on its probable patentability based on a search of the patent records for a small charge.

PLANTS, BUSHES, TREES,
VINES, ETC.

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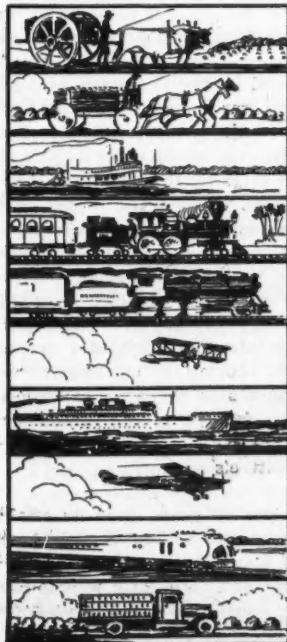
GEORGE E. COOK

Washington, D. C.

Registered Patent Attorney



Fiftieth Anniversary
OF
1884-Chase & Co.-1934



AT SANFORD fifty years ago the two Chase brothers founded a business which since has become a Florida institution. Today, we of CHASE & CO. are proud and grateful for the continued presence and activity of these two founders, who through freezes, panics and depressions have guided this business to this point.

We are grateful also to the large number of Florida growers and Northern dealers whose friendship and confidence have made possible our continuing growth and expansion over this period.

The record of the past is significant but only as it may indicate our ability to render superior service in the future. The effort to serve, and to serve better, continues to be our first aim.

Chase & Co. GENERAL OFFICES
SANFORD, FLORIDA

Growers and Shippers of Citrus Fruits and Vegetables
Grower's Supplies Chaco Fertilizers

IMPRESSIONS

(Continued from page 14)

if ever they knew, they had promptly forgotten the late W. J. Krome of Homestead . . . yet few men have contributed more to the cause of citrusiculture in Florida . . . not to mention Mr. Krome's contributions toward the introduction and culture of other sub-tropical fruits and plants . . . How many know that the Stone Farm Association which appears in the membership roster of the Horticultural Society is the personal farm operating organization of Charles A. Stone of Stone & Webster corporation? . . . Or that, in addition to its fruit holdings, the Stone Farm Association is the largest raiser of Morgan horses in this country? . . . the horses are raised on the Stone farm in Vermont . . . What is that old wheeze about it being possible to take some boys out of the country, but impossible to take the country out of some boys? . . . The season before the Big Freeze of 94-95 Florida shipped 140,000 boxes of lemons . . . The foregoing thought is prompted by looking over the sample ballot on the day before the Primary election, when these lines right here are being written . . . If rust mites have any thoughts, they must be pretty bilious thoughts these days . . . All over the Florida peninsula right now there is an unprecedented war on rust mites . . . as a result, Florida ought to have one of the best quality citrus crops in many years for next season . . . How many know that John Gribbel, president of the Tampa Gas Co. and owner of that fine grove at Elfers in Pasco county, also is treasurer of the Curtis Publishing Co. of Philadelphia? . . . or that B. F. Floyd of Davenport and Maj. W. L. Floyd of Gainesville are quite different persons? . . . though both are generally spoken of as "Profesor Floyd." . . . Bayard F. Floyd of Davenport is one of the few living specimens of the successfully reformed professor . . . Major W. L. Floyd still works at the professoring trade . . . Or that while A. M. Pratt's address is given as Winter Haven, he in reality lives in Winter Park? . . . He'll receive mail addressed to either place . . . but don't get confused and send it to Winter Garden or Winter Beach . . . These Florida "Winters" do confuse some outsiders . . . Harold Jackson of Longwood, wanting to fence some new land, inquired of us recently particulars of the requirements of the post-hole code . . . Searching about we failed to locate our copy of the post-hole code among the various

THE CITRUS INDUSTRY

code publications in our possession . . . Knowing that post-holes would not have been overlooked in the code making process, we got the research department of Leland Chubb's City Barber Shop in Sanford to look into the matter for us . . . So now we are able to advise Harold, and our other interested correspondents, that there is no post-hole code in effect as yet . . . it has been delayed in promulgation in its final form . . . early drafts of it are said to have been found to conflict in places with the doughnut-hole code and the macaroni-hole code . . . hence the delay.

PLANT FOOD NEEDED

AS FERTILIZER

Montgomery C.R.

It is generally conceded by scientists that the three elements most frequently needed by crops are nitrogen, phosphorus, and potassium. These elements are deficient in many soils and are required in relatively large quantities by most crops. These are the elements that are supplied in all complete fertilizers, and for the reason that so much attention is paid to them, the fact that at least a dozen other elements are needed for normal crop growth is often overlooked, according to an article just published in The Fertilizer Review.

In the latter group are such elements as calcium, magnesium, sulphur, manganese, iron, copper, zinc, sodium, chlorine, boron, and perhaps others. All of these elements must be obtained from the soil or must be added to the soil in fertilizers. Carbon, hydrogen and oxygen which play such an important part in plant growth are derived from the air and from water. Most of the so-called minor plant foods are present in the great majority of soils and are required by crops in very small quantities. Calcium, magnesium, and sulphur however, are required by plants in relatively large quantities.

Calcium and sulphur are just as essential to plant growth as nitrogen, phosphoric acid, and potash. They are, however, present in a majority of soils in substantial quantities, and very large quantities are supplied by commercial fertilizers. For these reasons, calcium and sulphur deficiency symptoms are rarely observed in the field.

Magnesium, also a very essential element, is present in many soils in sufficient quantities for normal plant growth, but it is very frequently deficient in the lighter, sandier soils such as those of the Atlantic seaboard and Southeastern and Gulf Coastal Plains. It is now being used exten-

June, 1934

sively as a plant food on tobacco and potatoes, and in field trials some very positive results have been obtained on cotton, corn, and other crops.

Manganese deficiency is general in southern Florida, but very "spotted" in other sections of the country. Manganese is rarely deficient in acid soils.

Copper has been found to be deficient in certain peat soils, particularly those of the Florida Everglades and in certain sections in New York and Michigan. There is some evidence of copper deficiency in other soils, but there is no indication that the use of copper as a fertilizer will become general.

Zinc, in the form of zinc sulphate, has been found to be effective in controlling the rosette disease in pecan and citrus trees.

Many experiments that have been conducted both in Europe and in this country indicate that a number of other elements may be needed for complete plant nutrition, but there is practically no evidence indicating that other than the elements mentioned above are needed in fertilizers except in very exceptional cases, since ample supplies are nearly always present in practically all soils. Many of these elements are also present in the fertilizers that are customarily used.

Montgomery C.R.

CITRUS FRUIT HANDLER'S

LICENSE REVOKED BY

SECRETARY AGRICULTURE

The license of C. R. Montgomery, Pomona, California, operating under license No. 23, for shippers of oranges and grapefruit grown in the states of Arizona and California, has been revoked by the Secretary of Agriculture it was announced by the Agricultural Adjustment Administration.

The revocation came as the result of findings by the Secretary that this firm had violated the license in nine instances. Violations consisted of shipments in excess of the allotment made to the firm during the proration period of January 7, 1934 to February 17, 1934, of improper representation of shipments to control board causing it to issue excessive allotments to the firm, of refusal to submit records to the committee representatives, and disregard of the committee's authority.

In the 20 years since its establishment in the United States, Agricultural Extension work has served the farmer and farm wife well in almost every conceivable kind of emergency, as well as in routine duties.



GROWERS Listen to this:

"Tell you-
The Summer Application Brought Me this Extra Profit!"

EXTRA profit depends largely upon the quality of citrus fertilizer you use for Summer feeding. It is this application that must develop and mature your present crop and stimulate growth for next year's fruit.

And right now your citrus trees are absorbing every bit of food energy they can reach. They are converting this into quality fruit... fruit that will bring top prices. Supply your trees with all of the necessary plant food elements they need at this season by using Armour's BIG CROP Fertilizer.

There is a brand of Armour's BIG CROP Fertilizer to meet your exacting requirements. The exceptional care with which these brands are blended and balanced; the high quality plant food they contain--these are factors responsible for their popularity. Cash in on their quality-producing value this Summer.



Our experienced field representatives are ready to consult with you about your fertilizer requirements for this season.

ARMOUR'S BIG CROP FERTILIZERS

Write for a copy of our new "Citrus Booklet"

ARMOUR FERTILIZER WORKS
JACKSONVILLE, FLORIDA

Florida Citrus Exchange Elects Officers

At a recent meeting in Tampa officers of the Florida Citrus Exchange for the following year were elected.

Officers and directors were re-elected with the exception of A. B. Steuart, comptroller for the last two years, who was succeeded by S. L. Looney, active head of the Growers Loan & Guaranty company. A retain of 10 cents a box was set for the new year.

Looney was elected after long consideration by the directors and by the last vote counted in a secret ballot. At the election of officers during the morning session this office was turned over to a special committee on salaries to see how much could be saved by adding to Looney's duties. He also was made treasurer to the board.

Looney Opposes Change

Looney asked that no change be made, and several members said the action was taken to please the farm credit administration. Efforts were made twice while the board sat as exchange members to have the charter amended to provide for an executive vice president who would not be a director, but both efforts failed of the necessary three-fourths vote. In discussing it members spoke of the treasurer being the executive vice president.

Directors Francis P. Whitehair and Lee S. Day praised the ability of Steuart, who was city comptroller of Tampa under the McKay administration.

Looney has been treasurer and manager of the Growers Loan & Guaranty company for the last 12 years. A year ago he was elected president of the Production Credit corporation, a government agency with headquarters at Columbia, South Carolina, but resigned to remain with the Growers loan and the exchange.

Taylor Asks For Salary Cut

John S. Taylor, in accepting reelection as president of the exchange and chairman of the board of directors asked that his salary be reduced.

Other officers are Frank G. Clark, Largo, first vice president; A. W. Hurley, Winter Garden, second vice president; J. O. Carr, Fort Ogden, third vice president; L. L. Lowry, Tampa, fourth vice president.

C. C. Commander was re-elected general manager; Harold Crews, assistant to the general manager; E. Patterson, sales manager; Earl Lines, advertising manager; L. D. Aulls, traffic manager; O. M. Felix, secretary, and William Hunter, attorney. O. J. Harvey was re-appointed a district manager and Taylor and Commander were authorized to appoint other district managers after conference with directors interested.

The only change in the board of directors was seating of H. C. Palmer, of Winter Garden, to succeed J. G. Grossenbacher, of Plymouth.

Provide for Advertising

The retain of 10 cents a box is to cover selling and advertising and sales promotion. The retain was 12 cents last year, including one cent for the Growers Loan & Guaranty company. There will be no retain this year for the Growers loan. Commander recommended that no retain be collected on fruits sent to canneries, and the board accepted his recommendation that half of the retain collected this season on house sales be returned immediately, with more later if possible. The retain on truck sales was set at two cents a box.

"There will be no special assessments for the Tampa office, unless you vote it later," Commander said.

The board adopted a policy providing that canneries using exchange labels on their citrus products should conform to the highest quality standards. The exchange itself is stepping out of the canning business.

Considerable time was given to disposing of matters dealing with the report of J. W. Jones of the Farm Credit administration, which is now being considered by associations and sub exchanges.

Federal marketing agreements and the national stabilization plan, which became operative during the citrus season, already have proved their worth, General Manager Commander said in his annual report, which discussed prices and proration in detail.

The season will go down as a turning point in citrus history, the report said. Delivered prices for exchange fruit ranged from \$2.50 to as high as \$6 a box. Prices were low until market control and proration were made effective.

Shipments from Florida by rail, boat, and truck up to May 15 totaled 60,278 cars, of which 36,695 were oranges, 18,869 were grapefruit, and 4714 were tangerines. The exchange shipped less fruit by rail and more by water. Truck shipments increased 2.9 per cent.

Much of the credit for price improvement must go to the marketing agreement and the state control committee, the report said. Other factors were better quality, better times, better credit and strenuous sales effort.

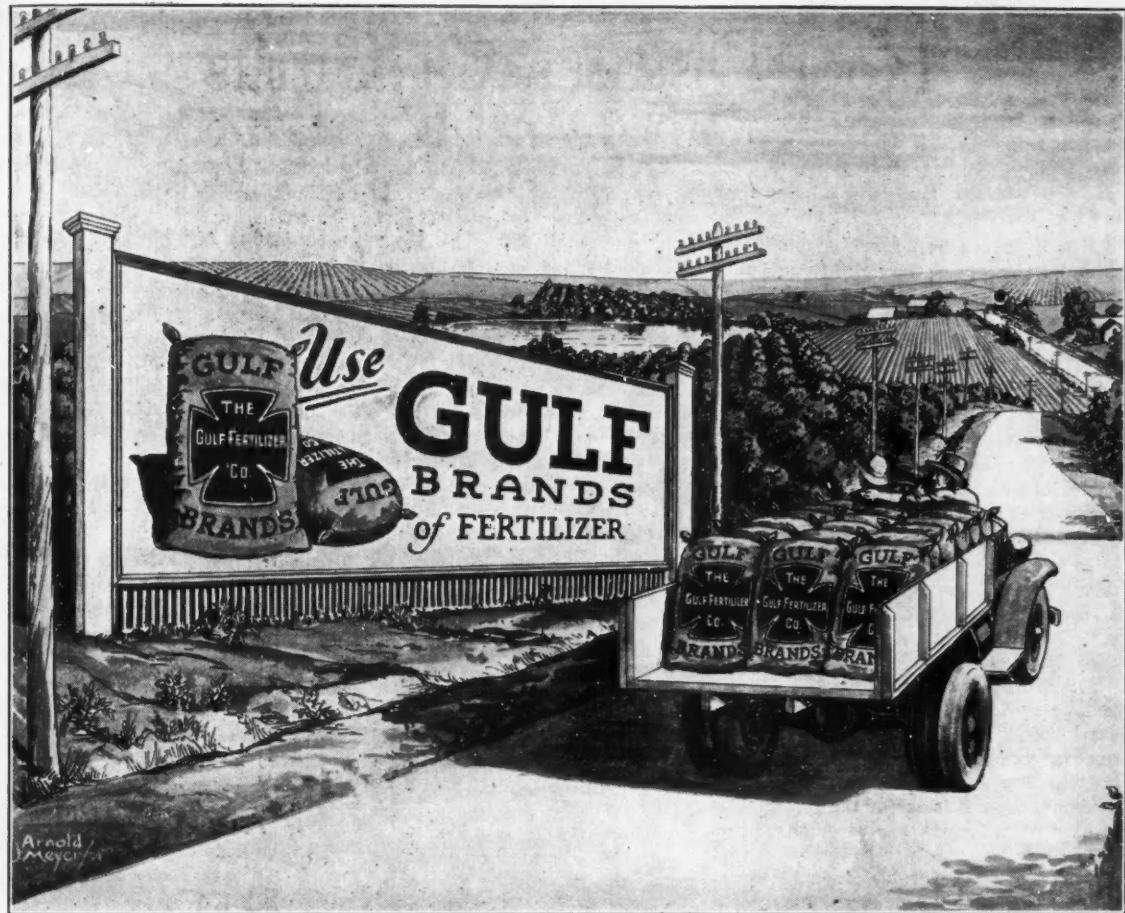
John S. Taylor, president of the Florida Citrus Exchange, also was elected president of the Growers Loan & Guaranty company at the annual meeting. Other officers are S. L. Looney, executive vice president and treasurer; H. Guy Nickerson, vice president; E. G. Austin, secretary; L. M. Turner, assistant secretary and counsel, and A. R. Bogue, manager of the Guaranty Operating company.

REPORT OF INOCULATION STUDIES WITH LEGUMES DRAWS WIDE INTEREST

Gainesville, Fla. — The relationship of some 40 species of leguminous plants from the standpoint of inoculation has just been reported in a paper by Dr. W. R. Carroll of the department of botany and bacteriology of the University of Florida. The study on cross-inoculation of legumes was published recently in Soil Science, one of the leading scientific magazines in the United States, and has received wide comment.

More than half of the legume species which Dr. Carroll studied were crotalariae, this group have come into prominence in Florida and the Southeast in recent years. The paper gives methods for the improvement of inoculation cultures which can be used by commercial culture concerns.

Dr. Carroll's paper has created considerable interest, and he has received numerous requests for reprints from scientists in the United States and at the Rothamsted Experiment Station in England. The materials reported were based on his thesis for the Ph. D. degree at the University of Minnesota.



"Good advice!"

HUNDREDS of outstanding growers throughout Florida agree that it's good business to use Gulf Brands of Fertilizer. And there's a reason of course. Gulf Brands are really balanced fertilizers — made expressly for Florida soils. • Essential plant foods are contained in correct proportions — each derived from carefully selected materials to suit specific crop purposes. • Whatever you're growing — citrus, truck crops, flowers, grass or ornamentals you can profit by using Gulf Brands of Fertilizers. • And with Gulf Brands go the friendly cooperation and reliable assistance of the Gulf Field Man. Year round grove and farm inspection with depend-

able advice about pest and disease control, cultural problems and fertilization practices. No careless, haphazard recommendations. The Gulf Field Man, is thorough in his investigations. • So if your crops have not come up to your expectations — if results have not been all that you've hoped for — change to Gulf Brands and Gulf Field Service. Then watch the difference. • The Gulf Fertilizer Company, 36th Street, South of E. Broadway, Tampa, Florida., Gulf Field Men at Tampa, Clearwater, Bartow, Wauchula, Bradenton, Lake Wales, West Palm Beach, Orlando, Cocoa and Leesburg. • • • •

THE GULF FERTILIZER COMPANY

36th Street, South of East Broadway, Tampa, Florida

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JACKSONVILLE, FLORIDA

Root Diseases Of Citrus

BY WALTER J. BACH

Plant Pathologist, Texas Agricultural Experiment Station, Substation
No. 15, Weslaco, Texas

Citrus diseases may be expected to become of increasing importance in any new country where Citrus is grown as the country develops and the trees become older. Root diseases of Citrus are very important wherever they occur but they are rather obscure to the average grower. It is the purpose of this article to describe some of the more important root troubles of Citrus, in order to assist the grower to recognize those diseases which are present as well as any new ones which may appear.

Some of the most serious diseases that occur on Citrus attack the roots and trunk of the tree. Diseases that attack these portions of the tree are most likely to prove fatal to the entire tree and are more difficult to treat than those affecting the branches, leaves and fruit. In countries with dry climates where irrigation is practiced, diseases of the roots and base of the trunk are especially important as the moisture in the soil is likely to be favorable for the growth of diseases producing fungi. Diseases affecting the top of the tree are usually more or less temporary as new leaves and small branches which have been killed may be developed again, provided the roots and trunk remain in a healthy condition.

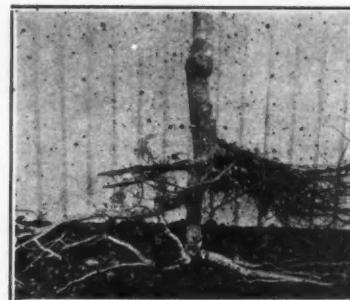
Diseases which occur on the roots of Citrus are not readily visible until after they have made considerable progress, and then they become indirectly noticeable through their effect on the tree. For this reason root diseases are not only difficult to recognize but they are difficult to treat, due to the location of the affected parts and the progress which they are likely to have made before being recognized.

The prevention of root diseases is of the highest importance in so far as it is possible. There are certain effects which may be initiated by injuries or by insects or animals, such as termites or gophers, which produce symptoms that closely resemble those caused strictly by fungous diseases. Wounds caused by such injuries or by cultivation and climatic extremes may provide an entrance for disease organisms. Many of the practices which result in injury are caused by carelessness or negligence in some op-

eration in caring for the grove and may be avoided if proper precautions are exercised.

Root diseases of Citrus, although of importance only comparatively recently in the lower Rio Grande Valley of Texas, are by no means of recent origin. Gum and root diseases were reported as early as 1834. They became prevalent in the Mediterranean Countries about 1863, in South Africa and Australia in 1891 and on the American continent about 1875.

Much of our knowledge of root diseases of Citrus has been developed since 1911 when experimental work was started in Florida by Fawcett



Termite Injury to Roots of Citrus Which in Turn Had Caused The Tree to Turn Chlorotic And Stunted.

and Burger. The symptoms of root diseases on Citrus, as they were first recorded, were described as being very similar to those at the present time. One writer states that in the Azores in 1834 sweet orange trees 200 to 300 years old showed a gumming on the trunk near and sometimes beneath the surface of the ground. The leaves turned yellow and fell off in great quantities and the trees put on heavy crops of fruit. These are some of the important symptoms of root diseases known at the present time. The foliage of the effected tree becomes thin and presents a chlorotic appearance. These symptoms, however, may accompany other diseases affecting above ground portions of the tree or may be caused by an unfavorable soil environment, so they cannot be considered separately as a positive indication of the presence of some root disease. The leaves appear smaller on

a tree having diseased roots than on a normal healthy tree. Examination of the roots of affected trees, as evidenced by the sickly appearance of the tops, will often show an exudation of gum near the surface of the ground and a decayed condition of the bark or wood of the roots. The decay may not necessarily be accompanied by gum exudation. In many cases, the symptoms of root diseases are confusing while in others they may be fairly specific.

Phymatotrichum or Cotton Root Rot

Occasionally, under favorable conditions, cotton root rot occurs on Citrus. This is a fungus disease caused by *Phymatotrichum omnivorum* (Shear) Duggar, and is considered to be the most destructive plant disease in Texas. It attacks a long list of cultivated and non-cultivated plants, including many important field and truck crops, fruit trees, and ornamentals. In addition to the losses which it causes every year to the cotton crop, it caused serious reductions on many other susceptible crops such as sweet potatoes, alfalfa, okra, and carrots. Since young trees are often intercropped with vegetables or other crops, it is important to consider the susceptibility of any crop used for this purpose. There is no doubt that the use of very susceptible crops in this manner may endanger the citrus trees to root rot, as the disease may spread to Citrus from other susceptible crops, such as cotton, carrots, sweet potatoes, or okra. So far as is known, root rot has occurred on Citrus only in Texas. Experience would indicate that it attacks only young trees, i. e. within the first three years after they have been set in the field. Only scattered trees killed by root rot under normal field conditions but heavy losses have occurred in small areas which had been improperly intercropped.

Trees which are affected by root rot present a sickly appearance, as evidenced by yellowing of the foliage. They lack the thrift and vigor of healthy trees. Affected trees may overcome the diseases or the leaves may suddenly wilt and the tree die within a few days time. The leaves usually remain hanging on the tree when it dies, although a number of

them may shed during the time that it shows the sickened condition. If the roots of such a tree that is dying or that has recently died, are examined, the strands of the fungus can be observed. These strands are brown in color and are composed of a number of smaller strands or hyphae, of which the fungus organism causing the disease is composed. In advanced stages, the bark sheds from the root and very little evidence of the organism may remain. Fragments of the decayed bark may remain attached to the woody portion of the root. The Cleopatra and Trifoliata orange have been proven very susceptible while the Sour orange appears to be highly resistant. Other possible citrus rootstocks are still being tested for resistance.

There are certain preventive measures and treatments that have shown considerable promise in the control of root rot. The sour orange rootstock should be used as it has been proved highly resistant. Susceptible



Young Grapefruit Tree Killed By One Of The Root Rot Organisms — The Only Visible Symptoms Of Disease Were, First The Appearance Of Yellow (Chlorotic) Foliage And Later The Loss Of Leaves.

crops such as sweet potatoes, cotton and okra should not be planted between the rows of young trees. Affected trees may be treated with a solution of bluestone, at the rate of one pound to ten gallons of water. The method recommended for the use of this treatment consists of sinking holes, one to one and one-fourth inches in diameter and fifteen inches deep, in the ground around the tree. The holes should be started out four to six inches from the tree and slope inward toward the tap root. Three to four holes around each tree should be sufficient. A shallow basin may be made around the tree to assist in holding the solution when it is applied.

The treatment may be applied as a single application or as three applications at one day intervals.

When a tree is to be reset where one has already died from root rot the soil should be treated with bluestone solution. The soil should be spaded up and a mixture of manure and sulphur worked into it. Cotton or other very susceptible crop should not be grown as a previous crop where trees are to be set.

Foot Rot or Mal di Comma

Foot rot or Mal di Comma is one of the most important gum diseases of Citrus. It occurs on Citrus in Texas but is of minor importance as compared to such diseases as Scaly Bark and Gummosis. The first record of this disease of commercial importance occurred in the Azores in 1834 and about 30 years later it was found causing serious trouble in the Mediterranean Countries. Foot rot first attracted attention in the United States in 1875 in California, and in 1876 in Florida. During the period from 1863 to 1870, in Sicily, foot rot became so destructive as to kill practically all citrus trees and the new plantings since then have been budded on resistant sour orange rootstock. It is one of the most destructive diseases in Japan at the present time and is of general occurrence in China and the Philippines. Foot rot is known to occur in virtually all countries where citrus trees are cultivated and is probably more widely distributed than any other citrus disease.

Foot rot or Mal di Comma affects citrus trees at or near the surface of the ground, and as a rule, it is almost always confined to the lower portion of the trunk and the upper portion of the highest main roots. Early symptoms of the disease consist of the appearance of small areas of decayed bark from which there is a slight exudation of gum. This may be preceded by a water soaked discoloration of this area. The inner bark and finally the wood underneath frequently decay and develops, especially in a humid climate, a very characteristic ill smelling fetid odor. The bark dies and breaks away in patches, leaving bare dead areas, and the disease continues to spread in all directions. Gum pockets are not uncommon, although gum formation may not be prominent in the early stages of foot rot. The areas of bark which are killed by foot rot are irregular in shape and variable in size. The disease usually continues to spread on the trunk and crown roots until it completely girdles the tree. The greater part of the root system

of the tree may become affected before there is any visible sign of the disease above ground.

After foot rot has invaded a large portion of the root system of a tree the effect of the disease may be seen on the above ground portion. The amount of foliage appears to be decreased, the leaves smaller and the entire tree may present a light yellow or chlorotic appearance. Such trees usually continue to bear a fair amount of fruit for a year or two and then produce an excessively large crop of small fruit just before dying. In the most severe cases, the leaves will show a deeper yellow along the midribs, indicating the lack of plant food which has been cut off as the disease girdles the trunk.

The exact cause of foot rot is still rather uncertain although citrus authorities have attributed it to a species of *Phytophthora*. This fungus is a soil organism which can grow and perpetuate itself in the soil over a long period of time. It is found most common in moist shady locations, in low heavy soils. Important factors which contribute to the cause of foot rot are; the use of susceptible rootstocks; exceedingly wet soil in contact with the trunk; poor drainage; deep planting; and injuries to the bark at the base of the tree, especially in wet weather.

After foot rot appears, the treatment consists of pulling the soil away from the base of the trunk and crown roots for a radius of two or three feet. This should be done carefully so that no additional injury will be caused to the exposed roots. If dirt is to be cleaned away from a number of trees, it can most easily be done by using pressure from a power sprayer. After the dirt has been cleared away, the diseased area can be cut out and the affected portion painted with Bordeaux paste. It is advisable to paint the exposed wood surfaces later with some good waterproof wound dressing to prevent the entrance of wood destroying organisms and boring insects.

The sour orange rootstock has been found to be highly resistant to foot rot and its use is recommended. Affected trees which have been seriously weakened should not be allowed directly around the trunk of the tree.

The most successful method of preventing foot rot is obviously the use of the resistant sour orange rootstock, budded high, especially for new plantings on heavy land. This method was used in Italy after the orchards were killed and has been used successfully for heavy soils in

Florida and California.

Other Root Diseases

There are other root diseases caused by fungus organisms which occur on Citrus but which are of rather uncommon occurrence or confined to limited geographical areas. Chief among these are *Armillaria* root rot which occurs in certain parts of California and Australia, and *Clitocybe* mushroom root rot which occurs in Florida. As far as is known, neither of these diseases occur on Citrus in Texas at the present time.

Sclerotinia root rot may attack Citrus which is growing on heavy wet soils. It has been found in Texas on the roots of dead trees and has been observed doing damage on very young sour orange seedlings in the nursery. This fungus usually causes the bark to present a shredded appearance. Cottony white mycelium may be present together with black sclerotia within or under the bark. Usually this disease is not serious as long as excessive moisture and poor drainage is avoided.

Dry root rot occurs to a limited extent in some citrus areas. In the active stage of decay it is difficult to distinguish from some of the other decays, but as it progresses the bark crumbles away and the dry, hard, dead wood remains. This dry decay in the wood frequently penetrates until a greater portion of the woody cylinder is involved and consequently, has a severe effect upon the tree. Excessive moisture at the base of the tree is considered the most important contributing factor. Prevention is the most important means of control. Due to the penetrating nature of the disease, it is difficult to treat it successfully by surgical methods. However, where individual roots are affected, they may be pruned out and the wound disinfected and painted with a waterproof compound.

Water Injury

High water table and lack of drainage has been responsible for the death of many citrus trees, not only in the Lower Rio Grande Valley of Texas, but in other sections where Citrus is grown. Not considering the injury caused by alkali, which may be due indirectly to high water table, a high water table prevents proper aeration and indicates a poor physical condition of the soil. Usually a high water table fluctuates more or less, while in some cases, it may be fairly permanent. Some citrus rootstocks appear to be capable of standing a temporary high water table better than others, but all citrus roots will be injured by long exposure to excessive water.

THE CITRUS INDUSTRY

Citrus roots become blackened upon long exposure to water and the smaller fibrous roots slough off. Some of the larger roots may die and become invaded by wood-rotting fungi which may be either saprophytic or semi-saprophytic. The supply of water available for trees determines to a large extent the type of leaf growth, as it has been shown experimentally (Floyd 1915) that excessive moisture is decidedly injurious from the standpoint of normal healthy foliage, without which the tree cannot function properly.

The method of treating trees suffering from high water table or excessive moisture will vary with the type of soil and other conditions. Precautions in irrigation, with provision for adequate drainage will do much to avoid injury from excessive moisture. Water should not be used for irrigation which carries injurious salts. Likewise, water should not be allowed to come in contact with the tree trunk, as this practice encourages decay and the development of fungus diseases. The application of various chemicals and fertilizers may be beneficial in the recovery of injured trees, after the water relation has been corrected.

CITRUS RESEARCH IN FLORIDA

(Continued from page 3)

frequently are assigned to Lake Alfred for stays of some length.

Results of citrus studies conducted for the most part at the Lake Alfred station already have been reviewed in this magazine—(Citrus Industry, February, 1934). In the same article was contained a list of the projects on which work has been in progress during the present fiscal period.

Growers frequently visit the citrus stations, singly and in groups. Motorades and other excursions to Lake Alfred from the counties that are the heaviest producers of fruit have been increasingly popular. Invitations to call for information are outstanding at all times.

Farmers and growers are welcomed whenever they appear in person at any of the Florida Agricultural Experiment Stations. In point of the direct contacts thus afforded, the citrus station at Lake Alfred holds high rank. Convenience of access is a helpful factor.

Other South Florida Stations

While neither the Everglades Station at Belle Glade nor the Sub-Tropical Station at Homestead is confined to citrus fruits, the investigations of both bear a definite relation to orange and grapefruit growing in the

distinctive regions they specially serve. Specific citrus experiments of no slight significance are under way at the last named. Soil problems affecting all crops in the Everglades are featured at Belle Glade.

Authorized by the legislature of 1921, the Everglades Station began its career in December, 1923. Up to July 1, 1933, \$503,252.47 had been spent, and the current annual budget is \$51,139.00. Inventory of buildings and equipment last taken—on July 1, 1933—demand values of \$159,060.00. Cultivated fields include 100 acres, and in addition 725.42 acres of undrained area is owned.

Establishment of the Sub-Tropical Station at Homestead in 1930 carried into effect an act of the 1929 legislature. Here the total acreage is 110, of which 60 is high pineland—40 cleared and 20 not—while Glades lands include 50 acres—20 drained and 30 undrained. Expenditures have been \$52,931.61, the inventory runs to \$16,340.00 and the yearly budget is \$13,319.00.

Field Laboratory Purposes

Cause and control of citrus "blight" successfully have been sought at the Cocoa field laboratory—the disease having its greatest vogue in the neighboring east coast sections. Among numerous additional studies under way here is one devoted to the widely distributed mushroom root rot.

Bradenton's field laboratory specializes on tomatoes, that at Hastings on potatoes, and the one in Leesburg on watermelons, ornamentals and grapes. Pecan diseases engage Monticello, while strawberry troubles are uppermost at Plant City and celery difficulties at Sanford.

FLORIDAN WILL LEAD HOME DEMONSTRATION WORK IN PORTO RICO

Tallahassee, Fla. — A Florida worker has been called on to direct the establishing of home demonstration work in Porto Rico, one of the main points in a rehabilitation program for the island.

The work is to be under the direction of the United States Department of Agriculture, and Department officials have asked Miss Mary E. Keown, district agent with the State Home Demonstration Department, to head up the work. Miss Keown has been granted a year's absence from her Florida duties, effective July 1, subject to approval by the State Board of Control at its monthly meeting Saturday.

Fertilizer Industry Appraises Its Code

White Sulphur Springs, West Virginia, June 12.—Fully five hundred fertilizer men from all parts of the United States are here for the opening session of the Tenth Annual Convention of The National Fertilizer Association.

The Association includes over five hundred manufacturers of fertilizers in all parts of the Country.

In delivering his address as President of the Association, John J. Watson, President of International Agricultural Corporation, New York, said that, "Certainly the fact that we have maintained an active trade association for many years, that we have done a great deal of constructive work, accounts in a large measure for our success in obtaining early approval of our Code, and in being able to give effectiveness to its provisions. Through our Association, we have learned to work together and to cooperate. In fact, we have laid the foundation on which our whole recovery structure has been erected."

Mr. Watson pointed out that there are approximately 675 producers in the industry, and that they vary all the way from large companies who operate nationally, to the very smallest producer who sells locally a specialty fertilizer put up in small packages or bottles. He said that there has been practically no criticism of the Fertilizer Code by the small producers, and that the great majority in the industry feel that the Code has been very helpful to them and to the industry as a whole.

Dr. C. H. Kunsman, who has charge of fertilizer investigations in the Bureau of Chemistry and Soils, U. S. Department of Agriculture, discussed recent developments in fertilizer manufacture. He stated that the most significant changes in commercial fertilizer during the past ten years have been an increased use of ammonia and its compounds, an increase in the acidity of fertilizers, together with methods of correcting acidity by the use of limestone, an increase in the plant food content of fertilizers, and more efficient use due to better methods of application. He discussed the research work that has been carried on in his Bureau, particularly the production of phosphoric

acid by blast furnace and electric furnace methods. Dr. Kunsman pointed out that in view of the recent increases in supplies of potash throughout the world, the Department of Agriculture is now concentrating its efforts on practical methods for the production of forms of potash not now produced in this country.

Horace Bowker, President of The American Agricultural Chemical Company, and Code Authority representative on the Labor Relations Committee for the Fertilizer Industry, spoke on the labor aspects of the Code.

"While it is manifestly impossible to generalize upon the results of any piece of legislation so sweeping in scope and incidence as the National Industrial Recovery Act, the crowded, hectic year which has elapsed since the enactment of this legislation has, in my opinion, demonstrated clearly and unmistakably the fundamental soundness not only of the principles underlying this legislation, but also of the administrative machinery under which the Act has been made operative. A solid foundation is being laid for constructive self-government in industry, and the positive results already apparent more than outweigh the negative," said Mr. Bowker.

"In April, 1934, employment in the fertilizer industry was 15 per cent higher than for the preceding month, and 23 per cent higher than for April, 1933. Pay rolls for April, 1934, were 23 per cent higher than for the preceding month, and 56 per cent higher than for April, 1933. A 56 per cent increase in pay rolls with a 23 per cent increase in employment is indicative of progress toward the dual labor objective of increased employment and improved labor standards."

Mr. Bowker pointed out that the fertilizer industry is not a large employer of labor and that it is highly seasonal due to the very nature of agriculture. "In a sense," said Mr. Bowker, "it has been relatively easy for this industry to meet both in letter and in spirit the primary objective of the NRA with regard to wages and standards of employment. However, it is a clear-cut indication of

the good faith and sound ideals of this industry to be able to quote the industry's Code Authority to the effect that our performance under the labor provisions of the Code has been all that could be asked for and that this is one of the articles of the Code that has worked most smoothly."

Charles J. Brand, Executive Director of the Code Authority and for the past nine years Executive Secretary and Treasurer of the Association, spoke on "Industry Stabilization Through Open Pricing." "Too many ascribe to the term 'stabilization' the unfair enjoyment of unreasonably high prices and fat profits," said Mr. Brand. "I say emphatically that the open pricing provisions of the Fertilizer Code are not and shall not be used to raise prices unduly, unreasonably, or unfairly."

Mr. Brand pointed out that stabilization does not mean or contemplate the achievement of selfish advantage either by one member of the industry or by the whole industry. It rather contemplates the rendition of economic services required by and in the interest of the public, with reasonable compensation therefor and no more. He emphasized that open pricing is not price fixing and that every member of the fertilizer industry is free to sell his products at any prices he sees fit, so long as they are not below cost, and he may sell below cost to meet the prices of a competitor whose costs are lower.

"Operating under its Code, the fertilizer industry may make a small profit this season as compared to heavy losses during the past three years. It has reemployed a large number of men at higher wages and yet the farmer is getting his fertilizer at very reasonable prices," said Mr. Brand. "Furthermore, reports from reliable sources in several States show that small manufacturers have not suffered from operating under the Code; in fact, they have increased their business over last year by a larger percentage than their big competitors."

Remnants of jelly may be saved, melted together, and remolded. In this way they are made appetizing in appearance and often the flavor is improved.

When To Spray Citrus And When Not To Spray

By JEFFERSON THOMAS

In response to a request from a citrus fruit grower for a simplified schedule of the spraying in grapefruit, orange and tangerine groves recommended by the Florida Agricultural Experiment Station, Prof. J. R. Watson, head of the entomology department, gave the outline that follows:

"If whitefly or scale insects are numerous in the latter part of June, or shortly thereafter, an application of oil spray probably will be justified, particularly following one of bordeaux for melanose. In case the foregoing pests are not present in great numbers, control may be had from the lime-sulphur spray used for rust mites.

"Growers will do well to make sure that the rust mites themselves have been eliminated. Heavy rains wash them from the fruit, it is true, and during rainy periods they are attacked by a fungus disease. When the rainfall ceases for awhile, these insects nevertheless reappear. Even in July or August a two weeks' dry spell is likely to cause a considerable reinestation.

"When fall comes on, whitefly and scale again should be looked out for, especially in the last days of September and the first part of October. If inspection shows that the grove is heavily infested, a good clean-up spray with an oil emulsion will be needed. Application of the mixture should be ten days after the whitefly have disappeared from the wing but before they have reached the purple stage.

"With the spraying thoroughly done at that time, it is hardly likely that any more will be required for whitefly or purple scale before April or May, although the Florida red scale may need additional attention. In November, December and January rust mites again are to be expected. As they are found, which will be in warm weather, the trees should be sprayed with lime-sulphur or dusted with sulphur. At this season, lime-sulphur 1 to 40 can be used with safety.

"Infestations of whitefly or scale in the late spring months, if at all heavy, will call for two sprayings with the oil emulsion, a month or six weeks apart. Meanwhile, beginning

in December, it will have been wise to watch the trees for aphids, destroying every colony found. This can be done either by dipping in a bucket containing sulphate, or by spot dusting. Aphids breed with great rapidity, and in the winter no chances can be taken with them. Tangerines may have to be dusted again at blooming time, with a three percent nicotine-sulphate lime-dust.

"April also will bring the rust mite problem once more. Spraying or dusting with lime-sulphur whenever they are observed in substantial quantities is the solution, and this practice needs to be continued on through May and June. Spraying with

melanose with Bordeaux likewise is a spring-time chore. Usually a follow-up spray of an oil emulsion will be required sometime in June. This supplementary spray application generally is necessary in addition to control with fungi. The latter should be reintroduced into groves during June or July, however, if it does not come back naturally.

"Sprays should be applied when they are needed. Yet it is well to do spraying only in case the insects are very abundant. Watch them and their spread, and spray whenever you feel the cost will amount to less than the probable damage. Applications according to the calendar, beginning in April and repeated every six weeks, are a wasteful proceeding. Materials put on under that plan doubtless are of little real value in many cases. A much more economical program is to spray for the sun-dry pests when they appear on the fruit in seriously large numbers."

Citrus fruit industry, citrus advertising Lyons Says Industry Needs Ag- gressive Advertising

"Lack of advertising," states C. W. (Joe) Lyons, president of the Lyons Fertilizer Company, "is gradually causing Florida to lose her most important industry.

"The citrus industry has grown gradually until today it's gross sales bring to Florida between fifty million and sixty million dollars annually but the percentage of profit which the growers receive from this vast sum of money has been gradually dwindling until today it has almost disappeared.

"For years—in fact from the very infancy of the industry most growers have realized the need of producing the highest quality fruit possible. This year the immense value of developing this high grade fruit has apparently been more generally recognized than ever before. More money has been spent in spraying this past season than ever before with the result that the finest looking crop we have ever offered the consuming public is now in prospect," said Mr. Lyons.

"So far as it goes, this is fine, but the fact remains that no matter how splendidly our fruit may appear if it is not backed by a substantial attractive and logical advertising campaign the consumer is still going to buy California fruit and pay premium prices for it.

"There is no question as to the

effect of the millions of dollars California orange and grapefruit growers have spent in advertising to the consumer. One need only make a casual survey of any northern or eastern market to observe its reactions.

"The fact that Florida oranges and grapefruit have a flavor which cannot be duplicated and that the juice content of Florida citrus fruit is much greater than that of citrus fruit grown in any other section of the country doesn't mean a thing to the consumer, because he has never been made aware of those facts."

Mr. Lyons has been one of the most active citrus factors in the state in endeavoring to secure adequate advertising for Florida's citrus crop. He has devoted much time and gone

FOR SALE

Lists of Florida Citrus Growers
compiled from recent survey
of groves, arranged by counties.
Name, address, acreage and legal
description.
Also list wealthy residents of
Florida.

W. L. Lamar

P. O. Box 333

JACKSONVILLE, FLA.

June, 1934

to heavy expense to arouse Florida citrus growers to the need of such advertising.

He closed his statement to The Citrus Industry by saying "the Florida citrus crop is the only food commodity of national distribution in the country which is not backed by an advertising appropriation. Few, if any other commodities, offer the same profitable advertising potentialities as do the citrus products of Florida. We have reached a point now where we can either reap a rich harvest of profit by the expenditure of a relatively small percentage of our crop value for advertising, or we can lose an industry to others who have proven themselves aggressive in taking advantage of their advertising opportunities."

HEAVY INFESTATION OF SCALE

It has been called to our attention by Mr. Paul M. Dowling, California Spray-Chemical Corp., that a majority of the citrus growers of this state are overlooking the great increase of Purple Scale and Florida Red Scale in the last three weeks. While a great deal of spraying has been done to control Rust mites the grower has

THE CITRUS INDUSTRY

been entirely dependent on "friendly fungus" to control the Purple and Florida Red Scales.

Adverse weather conditions have kept these friendly fungi from developing rapidly enough to give sufficient control of the scales on which they prey.

To aid these friendly fungi, an application of a good summer oil emulsion should be made. An application at this time is especially beneficial as it also removes sooty mold fungus and allows the even ripening of early fruit. Spraying at a later date to control these insects is not recommended on early fruits as there is a tendency to delay ripening if applied shortly before shipping.

Tomatoes En Surprise

Peel 6 medium sized tomatoes. Remove pulp and drain off juice.

Cut six small squares from green pepper to use for garnishing, and chop the remainder. Mix the tomato pulp, $\frac{1}{4}$ cup chopped celery, and $\frac{1}{4}$ teaspoon salt with enough mayonnaise to bind ingredients. Fill tomato shell with mixture and serve on crisp lettuce, topping with a tablespoon of mayonnaise.

Twenty-five

Creole Loaf Cake

2 eggs
1 cup sugar
3 tablespoons butter
 $\frac{1}{4}$ cup milk
2 squares unsweetened chocolate

1 1-3 cup sifted flour
1 $\frac{1}{4}$ teaspoons baking powder
 $\frac{1}{4}$ teaspoon salt

Beat eggs well, add sugar gradually, melted butter and melted chocolate, and blend well. Add flour sifted with baking powder and salt, alternately with milk. Bake in greased pan in moderate oven fifty minutes. Spread with icing made of 1 tablespoon cocoa mixed with $3\frac{1}{2}$ tablespoon strong hot coffee and blended with 1 $\frac{1}{2}$ tablespoons butter worked into 2 cups confectioners' sugar with pinch of salt and 1 teaspoon vanilla.

Growers of citrus fruits are going after rust mites more vigorously than ever before, since they found that the cost of control usually is covered several times over by the increased returns for non-infested fruit.

Colored by Ethylene— Fruit brings "top prices"

In the coloring of fruit, science has found a method that costs little, and pays big. It's the Ethylene Gas coloring method.

Developed in cooperation with U. S. Department of Agriculture, the Ethylene Gas method is used by leading Fruit Exchanges, Associations and others, especially for Citrus fruits. It colors mature fruit in $\frac{1}{3}$ the time required with other methods . . . moreover Ethylene colors fruit evenly.

And, better yet, because fruit can be colored as wanted, the use of Ethylene Gas means . . . *your fruit goes to market when the price is at the top*. Cost? Only a few cents a full carload of fruit.

Learn about Ethylene fruit coloring. Write for the FREE booklet we offer . . . talk, too, with your Exchange Officials.

Sell tomatoes locally?

If so, pick them green-ripe and color them with Ethylene. You get them to market 2 to 4 weeks earlier than waiting for field ripening. Defeat field mice, wire worms, sun scald, cracking, wind and hail damage.



FREE Send for your copy today

This 20-page booklet, issued by the largest suppliers of Ethylene to the Citrus Industry, tells the story of Ethylene Gas for coloring mature fruit and vegetables . . . explains how it is used . . . by Fruit Exchanges and others. Write Carbide and Carbon Chemicals Corporation, Dept C, 30 East 42nd St., New York.

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**MORE THAN 100 GROWERS IN
ONE FLORIDA COUNTY ALONE
USE AMMO-PHOS
HIGH-ANALYSIS FERTILIZERS
ON CITRUS GROVES**

WHY WAIT LONGER...
to join this growing army of satisfied users?

AMMO-PHOS*

is available either as a material supplying 11 per cent nitrogen (13 per cent ammonia) and 48 per cent phosphoric acid; or as Ammo-Phos High-Analysis Complete Fertilizers supplying all necessary fertilizing elements in the exact proportions required by the citrus crop.

*Reg. U. S. Pat. Off.

For full details, including name of nearest dealer, write

AMERICAN CYANAMID COMPANY
Manufacturers of Aero Cyanamid and Ammo-Phos
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AMMO-PHOS High-Analysis Fertilizers Contain More Than 30% Plant Food

Citrus rust mites

Twenty-six

RUST MITE CONTROL
IS IMPORTANT WITH
LARGE CITRUS CROP

Gainesville, Fla. — With prospects for a large crop of citrus, when size and quality will be most important, growers are being urged to take measures against rust mite damages. Florida growers who own or operate 50,000 acres of citrus have attended recent extension citrus meetings, and they showed unusual interest in rust mite control, according to E. F. DeBusk, citriculturist with the Florida Agricultural Extension Service.

Rust mites, Mr. DeBusk says, dis- color the fruit, they reduce the size, increase evaporation loss and retard maturity. At these meetings he presented figures to show that russeted citrus sells for from 25 to 40 cents a box less than similar bright fruit. He further showed figures from grove records in the state that rust mites, on the average, reduce the size of the fruit about one packing size. Tests by the U. S. Bureau of Entomology show that evaporation loss on russeted fruit is from 75 to 100 percent greater than on bright fruit, and citrus growers all over the state are convinced that russeted fruit is slower to mature.

The last week of May and during June is the time when rust mites are most apt to attack oranges, while grapefruit is troubled sooner, says J. R. Watson, head of the Department of Entomology at the Florida Experiment Station. Sulphur is the remedy for rust mites, Mr. Watson says, and growers should be on the watch for these pests and spray or dust when they are found. Rust mites multiply very rapidly, first attacking the leaves and twigs, but they migrate to the fruit when it is about from a half to an inch in diameter.

Experiments have shown that in controlling rust mites much can be done toward controlling whitefly and scale, especially the young ones. It

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takes much more sulphur, however, than it does to kill rust mites.

Driving rains that leach out soil fertility and like climatic disturbances sometimes become discouraging to Florida farmers. When they compare these occasional minor ills with the devastating drouths and dust storms frequently prevailing in other sections, the feeling is restored that this state averages pretty well in respect to friendliness on the part of Mother Nature.

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June, 1934

vinegar eats the dirt, the sweet oil adds lustre and the turpentine acts as a dryer.

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July, 1934

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Three

Some Advantages Of Ground Phosphate Rock As A Substitute For Filler In Fertilizer Mixtures

By P. McG. SHUEY

Shuey & Company, Savannah, Ga., in 'Commercial Fertilizer'

The increased use of physiological acid materials in fertilizer formulas has stimulated interest in the materials available for use as filler or filler-substitute in bringing the mixtures to the desired analyses.

The question of the acidity or basicity of mixed fertilizer has been raised and a promising method for this determination has been proposed by Dr. W. H. Pierre of the West Virginia Agricultural Experiment Station. Among the results published in one of his earlier papers on the subject, Dr. Pierre found a sample of phosphate rock to have a basicity equivalent to 1122 pounds of calcium carbonate per ton. I have tried his laboratory method and find it works out satisfactorily. Also the calculated number of pounds of phosphate rock required in various formulas to give a definite basicity agreed rather closely and consistently with the data results of my experiments as determined using his method as originally proposed.

When considering acidity, it is desirable to differentiate between excessive or harmful soil acidity and the physiological (potential or actual) acidity of fertilizers.

Harmful soil acidity while sometimes due to continued use of acid fertilizers is perhaps more frequently due to poor drainage, loss of basic elements by leaching or to continued cropping. Soil acidity so high as to reduce yields of the crops grown should be corrected by direct application of lime, the amount depending on the degree of acidity, with due

care to prevent overliming.

Dr. H. P. Cooper of the South Carolina Agricultural Experiment Station, in his important work of making a survey—analysis of the cultivated soils in that state, uses a classification dividing the crops grown into five groups based on the lower preference of pH value or degree of acidity at which satisfactory growth may be expected, and recommends application of limestone in amounts varying from 1,000 to 4,000 pounds per acre depending on the extent of neutralization experience has indicated is sufficient. In this way the acidity of the soil itself is most satisfactorily reduced.

The physiological acidity of fertilizers can be regulated to the desired degree, and for some crops, slightly acidic fertilizers are preferable, or the acidity may be eliminated entirely by the use of sufficient basic constituents to neutralize or balance the free acids and acid salts present. In this way the acidity developed during the nitrification of the ammoniacal and organic nitrogen-bearing materials is offset. When fertilizer is applied to the soil there occurs an interaction between strong mineral acids, organic acids and soluble salts, concentration depending on the amount of moisture in the soil, that has a solvent and especially on the basic compounds present.

Manufacturers by experience are accustomed to pay attention to the chemical action that takes place in fertilizer mixtures. They know that certain mixtures should be put up in

base piles and stored to allow time for "curing," as otherwise they may have trouble from "seting." Some combinations tend to revert available phosphoric acid, while in others, much of the insoluble is converted to available during storage. Experience shows it is desirable to allow base piles to reach a practical stage of equilibrium, for during the curing process action between acids and bases will continue at least as long as there is any free phosphoric acid present in the mixture.

In comparing the effect of ground phosphate rock and limestone upon available phosphoric acid it is advisable to consider:

1. Loss of available phosphoric acid due to arresting chemical action;
2. Possible loss by direct reversion.

The indirect loss due to arresting chemical action may amount to considerably more than the direct loss by reversion, especially when relatively fresh super phosphate is used and when storage extends for an appreciable period of time.

The curing reactions that take place in superphosphate during storage is perhaps the simplest example of the effect of the free acid. All who have had factory or control laboratory experience know the wide difference in analysis between freshly made superphosphate and cured superphosphates. It might be stated here that relatively quicker action takes place between ground phosphate rock and free acid, when addi-

(Continued on page 22)



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